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News (cont. from p. 783)

The monitoring network at Parkfield, Calif. Scientists from the U.S. Geological Survey (USGS), working in cooperation with the State of California and several U.S. universities and institutes, have chosen a stretch of the San Andreas Fault at Parkfield, Calif., midway between San Francisco and Los Angeles, to concentrate efforts at monitoring ground surface deformation. The site was chosen for its relative "predictability." This stretch has ruptured five times since 1857, about once every two decades. The geologists believe that the next rupture will take place at Parkfield before 1990.

The last two Parkfield quakes, in 1934 and 1966, were each preceded by a magnitude 5 foreshock located 1.6 km from the main shock; each occurred 17 minutes before the main shock. According to geologists involved, this makes Parkfield a "uniquely well-behaved" site for deploying networks of high precision to monitor ground deformation and precursor seismicity.

Such a network is largely in place. The instruments that make up this network include some 30 high-gain seismometers. Data from these instruments are telemetered back to the USGS at Menlo Park, Calif., and in some cases are computer-analyzed in real time. About 50 strong motion instruments also have been deployed to give seismologists a reading on the actual quake.

The geodetic network at Parkfield makes use of the large-scale geodimeter network used throughout California as well as a two-color laser geodimeter to measure movement along either side of the fault. The laser geodimeter records information from a dozen baselines from 4 to 8 km in length. Other instruments deployed include clothline strain measurement devices and low-sensitivity creep meters. —DWR

Tropospheric Chemistry Research

To answer basic science questions about man's influence on the earth's troposphere and how to protect it, a National Research Council (NRC) panel has proposed a long-term international research program to study global tropospheric chemistry. The panel estimates that initial funding of \$10-\$20 million per year will be required, increasing yearly for the program's minimum 10-year life.

According to the panel, this proposed effort would be different from existing atmospheric chemistry programs, such as those concerning acid precipitation, for two reasons: First, the proposal calls for a long-term effort, not a short-term reaction to political pressures or, as noted by one member of the panel, "crisis response." Second, the panel emphasized the global framework and international cooperation requested in the proposal. According to panel members, many existing studies are urban or regional in nature and do not have the scope required to gain an overall understanding of the complex troposphere. Existing programs are seen as a foundation for what is envisioned as an all-encompassing program.

Robert A. Duce, chairman of NRC's Global Tropospheric Chemistry Panel and professor at the University of Rhode Island, speaking at a briefing on October 17, in Washington, D.C., summarized the overall objectives of the project: To find out how and to what degree the biosphere controls earth's climate and to determine over what time periods this takes place.

Long-term objectives of the program are:

1. To understand the basic chemical cycles in the troposphere through field investigations, theory aided by numerical modeling, and laboratory studies.
2. To predict tropospheric responses to perturbations, both natural and human-induced, of these cycles.
3. To provide information required for the maintenance and effective future management of the atmospheric component of the global life support system.

Specific science objectives of the proposed study include evaluation of biological sources of chemicals in the troposphere, determination of the global distribution of trace gases and aerosol particles, investigation of photochemically driven transformation processes as well as wet and dry removal processes for trace gases and aerosol particles, and the development of global tropospheric chemistry systems models.

In its report, called "Global Atmospheric Chemistry: A Plan for Action," the panel suggested that funding of individual investigations and investigators could be handled through already established National Science Foundation (NSF) and National Aeronautics and Space Administration (NASA) channels but indicated only that overall science management of such a program should be assigned to "an appropriate U.S. scientific organization." Other organizations expected to be involved include the National Oceanic and Atmospheric Administration (NOAA), the Department of Energy (DOE), the Environmental Protection Agency (EPA), and the Department of Defense (DOD), as well as universities, private research groups, and industry.

Members of the panel indicated that a future workshop, to be attended by 50-80 members of the U.S. and international atmospheric chemistry community, will be held to begin pinpointing specific research needs within the framework of the proposal. A steering committee is now in the process of organizing this meeting.—DWR

Atlantic Hot Vent Discoveries

By using the chemical concentration of water as a key to location, scientists from the National Oceanographic and Atmospheric Administration (NOAA) and several U.S. universities have identified three new Atlantic Ocean sites of mineral-rich hot vents. This discovery brings the total number of known Atlantic Ocean vent sites to four.

These Atlantic Ocean discoveries lead scientists to speculate that venting sites may be as prevalent in the Atlantic as they are in the Pacific. According to Peter Rona of NOAA's Atlantic Oceanographic and Meteorological Laboratory in Miami, Fla., hot seafloor vents were thought to occur primarily at fast spreading undersea ridges, such as those that exist in the Pacific Ocean, but not at the relatively slow spreading ridges, such as those found in the Atlantic.

In 1982 a venting area was discovered in the Atlantic along the mid-Atlantic ridge about 2,800 km east of Miami. Large deposits of manganese were associated with the site. The latest discoveries are located along the ridge, 800-1,600 km south of the original site.

In related news, scientists at the Scripps Institution of Oceanography have reported the discovery of biological communities in the Gulf of Mexico similar to those found in the Pacific hot vent areas.

According to Charles Paull, a member of the Scripps Geologic Research Division who took part in the research cruise last February when the discovery was made, the Gulf of Mexico communities are similar in their biology but exist within an entirely different geological setting. Chief among the differences is a lack of the high temperatures that have been associated with the Pacific vent sites. Instead, scientists involved believe that the minerals needed to sustain the communities may be supplied from the Florida escarpment. Paull will present his findings at the AGU Fall Meeting, to be held in San Francisco, Calif., December 3-7, 1984.

Geophysicists

Carroll Ann Hodges has been appointed assistant chief geologist for the U.S. Geological Survey's Western Region, headquartered in Menlo Park, Calif. She succeeds G. Brent Dalrymple, who has returned to research studies in isotope geology at Western Region headquarters after serving as assistant chief geologist for 3 years. Hodges joined the USGS Branch of Petrologic Studies in Menlo Park in 1970. Her research has consisted mainly of topical studies and mapping projects on the moon and Mars. She was principal investigator in Apollo 16 geologic analyses both before and after that lunar mission.

Since 1982 she has served with the survey's Branch of Western Mineral Resources as chief of an international minerals resource assessment project. In 1980-1981, Hodges was the AGU Congressional Science Fellow on Capitol Hill. She is a member of the AGU Public Affairs Committee.

Rafael N. Sanchez has been appointed visiting professor with the University of Buenos Aires and was accepted as a member-correspondent of the Academia Nacional de Ingenieria, Argentina. Sanchez, a professor of Laval University, is currently on sabbatical.

In Memoriam: Charles J. Daly, 94, died September 20, 1984. A member of the Hydrology Section, he joined AGU in 1979.

Paul A. Ditch, 68, a member of the Atmospheric Sciences Section, died recently. He joined AGU in 1963.

Hiroyuki Fukuyama, 36, died in August 1984. A member of the Volcanology, Geochemistry, and Petrology Section, he joined AGU in 1984.

AGU Lost Members

Mail to the following members has been returned, and we are unable to locate forwarding addresses. If you have information on any of them, please contact AGU by mail or call toll free at 800-424-2488.

- Eric D. Leavitt, Calgary, Alberta, Canada.
- David L. Fowler, Rohnert Park, California.
- David E. Harnish, Madison, Wisconsin.
- Lutz U. Schaefer, Mainz, West Germany.
- Michael W. Tubbman, Singapore.
- David B. Wenner, Rondebosch, South Africa.
- James E. York, Anchorage, Alaska.

Books

Precambrian Sulphide Deposits

R. W. Hutchinson, C. D. Spence, and J. M. Franklin (Eds.), *H. S. Robinson Memorial Volume, Geol. Assoc. of Can. Spec. Pap. 25*, Geological Association of Canada, Toronto, Ontario, vii + 792 pp., 1982, \$57.00.

Reviewed by Bruce R. Doe

This book is dedicated to Howard S. Robinson, who was born and educated in the United States, but who spent his professional career in Canada with McIntyre Porcupine Mines, concentrating on Precambrian mineral deposits. Although his career in mineral exploration was distinguished, his major contribution to earth science was probably as one of the founders of the Geological Association of Canada, an institution to which he made a bequest in his will. With this background, the strong emphasis on Canadian Precambrian mineral deposits should come as no surprise; of the 25 papers in this book, 21 are solely or primarily devoted to Canadian deposits. The two exceptions—those describing the Balmat, N. Y., zinc mines (at times the largest zinc producer in the United States) and the Cranston, Wisconsin, volcanogenic zinc-copper massive-sulfide deposit (the largest deposit of its kind found in the 1970's)—are each within a couple of hundred kilometers of the Canadian border. Although the title of the book is more expansive than the actual topics discussed, Canada is rich in Precambrian rocks and ore bodies, and Canadian scientists have been especially alert to tectonic influences in the formation of mineral deposits. These features, plus the fact that the country contains a very well exposed expanse of Archean rocks which is the largest in the world, facilitate the study of early crustal evolution and make the book of particular interest to geophysicists.

The book comprises two parts. Part I, which may be of greatest interest to geophysicists, is composed of four regional papers: one on the Superior, Slave and Churchill provinces by J. M. Franklin and R. I. Thorpe, a second on the Grenville province by A. L. Sangster and J. Bourne, a third on the Purcell Supergroup by T. Hoy (the Canadian equivalent of the Belt Supergroup in Canada), and the fourth on the Mackenzie fold belt by J. D. Aiken. Much information is included in these chapters that is not specifically related to ore deposits. For just two examples, there is a map of the greenstone and gneiss belts of Canada and another showing how the Grenville fits into a paleotectonic reconstruction with the Oaxaca metamorphic complex and Sveconorwegian province. A final paper by R. W. Hutchinson (one of the world's leading experts in metallogenesis) summarizes the whole book and brings some sense of common theme to both the regional papers and part II on case histories, i.e., the importance of heated submarine exhalations as a function of tectonic setting for the genesis of most Precambrian ores. The recognition of the importance of submarine exhalations in ore deposition began in Europe with Schneiderhohn in 1932, received support from Ofiedahl in the late 1950's, became firmly adopted in Japan in the 1960's, was introduced in Canada by the Australian R. L. Stanton in the late 1950's, and only achieved some degree of acceptance in the United States by the mid-1980's owing to writings of Charles A. Anderson after his visits to Miocene Kuroko ores of Japan. Models built especially on Kuroko deposits of Japan and the metal-rich brines of the Red Sea confirmed that the mineralizing fluid was evolved seawater. Thus, although all people working in this area found the active hydrothermal jets at 21°N on the East Pacific Rise to be exciting, exhalations were expected by researchers on ore genesis more than a decade before their discovery. It is a case of a modern feature being predicted from the fossil record, and Canadian scientists played a full role in this development.

Part II, comprising 17 case histories, was a mild disappointment to me, although it does help support the contention, in the final chapter, that submarine emanations are a key feature. The Geco base-metal massive-sulfide deposit (paper 10) is a world-class ore deposit that is described by R. G. Friesen et al., but the giant Kidd Creek deposit does not have a paper even though it has one of the most spectacular case histories in the use of genetic models and airborne geophysics in its discovery. It also is the world's largest producer of silver, Canada's leading producer of four other commodities, and will produce as much copper as a medium-sized porphyry-copper deposit (at an ecological 3 to 4 times the grade of porphyry coppers). Probably only Broken Hill, Australia, is a bigger zinc deposit. The giant Sudbury feature and its famous nickel deposits do not have a chapter either. The huge sediment-hosted Sullivan massive sulfide in the Purcell Supergroup of British Columbia has a chapter, but the huge Coeur d'Alene Pb-Zn-Ag vein deposit (which was once the world's largest silver producer) does not, even though it is just across the Canadian border.

an border in the United States and is hosted in the correlative Belt Supergroup. The reasoning for these kinds of omissions is given in the preface:

Many important Precambrian sulphide deposits are not considered in the volume. Absent are those that have been extensively studied and for which thorough descriptions and up-to-date genetic interpretations have recently been published. Specifically included are newly discovered deposits and older ones for which only limited or out-dated information has been available.

An excellent example of a previously undescribed world-class deposit is the chapter on the Cranston Zn-Cu deposit in northern Wisconsin by E. R. May and P. G. Schmidt. Furthermore, the airborne geophysical techniques of aeromagnetics and electromagnetics played a key role in discovery of the extent of the metavolcanic belt and the Cranston deposit itself. D. J. Robinson and R. W. Hutchinson propose a novel and controversial volcanogenic-exhalative origin for the nickel-rich massive sulfide deposit at Redstone, Timmins, Ontario. The book should also be of interest to investigators of the deep-sea polymetallic deposits for comparison and model building. So although the book does not furnish "one-stop shopping" on descriptions of Precambrian ore deposits of Canada, it is the only or the best source on a number of them. It is sufficiently comprehensive so that it will lead readers to other references on key deposits which may not be adequately discussed. At \$57, probably not many geophysicists will want the book for their personal libraries, but they should make sure that their institution has it, and taking a look through it would be very worthwhile. I recommend beginning with the summary chapter at the end.

Bruce R. Doe is Assistant Chief Geologist for the Eastern Region, U.S. Geological Survey, MS 953, Reston, VA 22092.

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Geomagnetism of Baked Clays and Recent Sediments

K. M. Greer, P. Tucholka, and C. E. Barton (Eds.), Elsevier, New York, xv + 324 pp., 1983, \$53.25.

Reviewed by Edward A. Mankinen

This book is an outgrowth of the symposium entitled "Time Scales of Geomagnetic Secular Variations," which was held at the 4th Assembly of the International Association of Geomagnetism and Aeronomy (Edinburgh, U.K., August 1981). The volume includes many of the papers presented, which described paleomagnetic results from both archeological materials and Holocene geologic deposits, as well as contributions solicited from other researchers in the fields of archeomagnetism and paleomagnetism. In a remarkably short time after the conclusion of the symposium the editors were able to elicit, edit, and assemble a large body of material from 40 individuals into a thoughtful, well-organized product.

The book is divided into four chapters; the individual contributions constitute sections within each chapter. A comprehensive reference list concludes each chapter. The first

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Cover. Maps of the ionospheric electron density, ion temperature, electron temperature, and line-of-sight drift as a function of UT and altitude during the May 30, 1984, annular eclipse of the sun. The measurements were made by the Millstone Hill incoherent scatter radar, using a 46-m steerable antenna pointed southwest at an azimuth of 223° and an elevation of 16°. The intersection of the radar beam and center line of the eclipse was at 37°N, 78°W at an altitude of 300 km. At this location the eclipse was centered at 1641 UT. The electron density at 300 km decreases to 70% of its value before and after the eclipse, with the minimum occurring 30 minutes after the center of the eclipse. The ion temperature shows only a small change. The electron temperature shows a 750 K decrease centered on the eclipse time. The line-of-sight velocity shows a perturbation near the beginning of the eclipse. (Figure courtesy of J. M. Holt, Massachusetts Institute of Technology Haystack Observatory, Westford, Mass. See news item "1984 Solar Eclipse," contributed by J. E. Sola.)

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two chapters are the shortest and provide a background for the rest of the book by discussing the processes by which various materials become magnetized and the methods that can be used to determine their age. Discussed in chapter 1 is the acquisition of a thermomagnetic magnetization (TRM) by baked clays, a detrital, or depositional, remanent magnetization (DRM) by unconsolidated sediment, and the processes by which these magnetizations are sometimes modified or destroyed. Also discussed is the lesser-known but archeologically important shear remanent magnetization (SRM), which is acquired when mud is thrown into a mold during the manufacture of adobe bricks. Topics covered in chapter 2 include a description of paleomagnetic correlation as a method of relative dating, the application of radiocarbon dating to sediment, tree ring and varve chronologies, sediment dating methods using radioisotopes other than ¹⁴C, and possible applications of the thermoluminescence (TL) dating method to both baked clays and sediment. Particularly welcome is a discussion of the sources of error in radiocarbon dating, which serves as a reminder that analytically precise ages do not necessarily guarantee geologic accuracy.

Chapter 3, the longest in the book, is devoted to studies of archeological materials. One of the main objectives of these studies has been to construct curves of geomagnetic secular variation so as to obtain information on the nature of the field and to use these reference curves as dating and correlation tools after archeologic sites. For secular variation studies to achieve their full potential, they must include measurements of paleointensity as well as paleodirection, and so the beginning of this chapter is devoted to a discussion of archeointensity methods. The Thelliers' method of paleointensity determination, which is a mainstay in paleomagnetic research, encounters special problems when it is applied to archeologic materials, and therefore the reliability of some of the earlier intensity results is not known. The situation, however, is not so bleak as some of the discussion may imply, and newer methods have been devised to overcome some of the earlier difficulties. Various alternating-field demagnetization techniques that are currently being investigated seem to show some promise as well. The rest of the chapter describes the results of archeomagnetic investigations in different regions of the world. Not only are summaries of previously published work provided, but some new data and references to work in press are also included, which should ensure that this book will not rapidly become out of date. Although an enormous amount of work is required to construct the reference curves, much progress has been made in several of the regions discussed. Because so many archeomagnetic data are thus combined into a single source, the reader can easily obtain a good idea as to the current state of secular variation research and can readily see how well the reference curves agree between studies and over how wide an area some features can be correlated. This chapter will be of particular interest not only to archeomagnetics and paleomagnetics but also to other geologists studying the Holocene, who could benefit from the use of the secular variation records being developed. [q] Although archeomagnetic studies are providing many details on past secular variation, each point on a reference curve is a geologically "instantaneous" reading of the geomagnetic field. Archeologic materials do, however, have the advantage of being able to provide accurate, absolute values of paleointensity. Lacustrine sediment, on the other hand, can provide essentially continuous records of secular variation but only relative paleointensity. These two types of studies can be complementary, and chapter 4 describes the progress that is being made in the study of unconsolidated sediment from various environments. The editors begin this chapter with a brief description of dating devices and measurement procedures, followed by summaries of results from rapidly deposited sediment in Europe, North and South America, and Aus-

tralia. The chapter concludes with a discussion of statistical methods of data analysis, including data smoothing, comparison of related records, and spectrum analysis.

Overall, I find little to criticize in this book. Preparation of the text as camera-ready copy probably contributed to its timely publication. However, it is also somewhat harder to read than if it had been typeset, particularly because many of the punctuation marks seem to have become faint and indistinct during the final reduction. Because a few of the figures may not be entirely clear to the uninitiated reader, the individual contributors might have paid more attention to the figure captions, although most of the figures are well prepared and effective. In general, the individual sections seem to be of appropriate length for the topics addressed. The text is well edited, and there are very few typographical errors and little remaining jargon, such as "seriatim dating." The editors have also succeeded in their intention of having the volume "... read as a book rather than as a collection of papers." Students and professional geologists alike should find it a valuable reference work.

Edward A. Mankinen is with the Geologic Division, Branch of Isotope Geology, U.S. Geological Survey, Menlo Park, Calif.

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POSITIONS AVAILABLE

Faculty Position in Structural Geology/Tectonics. The Department of Marine, Earth and Atmospheric Sciences, North Carolina State University, has a tenure track opening at the Assistant or Associate Professor level in the area of structural geology/tectonics. The position will be filled for the beginning of the Fall 1985 term. The department currently has 31 full-time faculty, including 12 geologists and geophysicists.

The successful applicant will be expected to have completed the PhD degree. The individuals from whom we request letters of recommendation should discuss not only your professional competence, but also other aspects of your background that make you particularly qualified to serve as a Congressional Science Fellow.

The fellowship carries with it a stipend of up to \$28,000 plus travel allowances.
How to apply: Candidates should submit a letter of intent, a curriculum vitae, and three letters of recommendation. The letter of intent should include a statement of why the fellowship is desired, how you qualify for it, what issues and congressional situations interest you, what role you envision as a congressional science fellow, and what outcome you hope for in relation to career goals. The individuals from whom you request letters of recommendation should discuss not only your professional competence, but also other aspects of your background that make you particularly qualified to serve as a Congressional Science Fellow.

Sedimentary Geochemistry/Geologist. The Department of Geological Sciences at Lehigh University announces the availability of a tenure track position at the Assistant Professor level starting September 1, 1985. The successful candidate will be expected to teach both graduate and undergraduate courses and to maintain an active research program. Primary consideration will be given to those whose research experience and professional interests are in low-temperature sedimentary geochemistry, but not excluding candidates in related research areas who also be considered. The Department of Geological Sciences has nine faculty members and some 50 graduate students. Research facilities include automated XRF and XRD within the department, electron microprobe, analytical SEM, TEM, A.A., etc. are available on campus. Respond with a letter describing research interests, full curriculum vitae, and the names of three references by December 15, 1984 to: Charles B. Schar, Chairman, Department of Geological Sciences, Lehigh University, 693 Williams Hall, Bethlehem, Pennsylvania 18015. Applications received after December 15 may not be given full consideration.
Lehigh University is an equal opportunity affirmative action employer. Women and minorities are especially encouraged to apply.

Career and Family: Making It Work

AGU Fall Meeting
Wednesday, December 5
6:00-8:00 P.M.
Crystal Ballroom
San Francisco Hotel

Connie Sancetta of Lamont-Doherty Geological Observatory will moderate a discussion of how best to balance active involvement in a career with having and raising children. Panelists will be Tanya Atwater (University of California, Santa Barbara), Suzanne Beski-Diehl (Michigan Technological University), Laurie Brown (University of Massachusetts), and Sylvia Garzoli (Lamont-Doherty Geological Observatory).

This program has been arranged by the AGU Education and Human Resources Committee. Refreshments will be available.

Postdoctoral and Research Associate Positions/INSTRUCT. The Institute for the Study of the Continents (INSTRUCT) invites applications for postdoctoral and research positions in programs in ongoing study of the continental crust, including COCORP, or to initiate new programs of crustal study. The Ph.D. is required, and experience in geophysics or geology is desirable. Send vitae, list of publications, and letters of recommendation to Professor Jack Oliver, Institute for the Study of the Continents, Snee Hall, Cornell University, Ithaca, NY 14853. An equal opportunity/affirmative action employer.

Congressional Science Fellowship. Opportunity for a one-year assignment (September to August) or the staff of a congressional committee or a House or Senate member as an advisor on a wide range of scientific issues affecting public policy questions. Individuals who are AGU members and U.S. residents are invited to apply. A broad background in science is expected, as the various duties entail require the applicant to be articulate, literate, flexible, and able to work well with people from diverse professional backgrounds.

Public policy background is not required although such experience and/or demonstrated interest in applying science to the solution of public problems is desirable.

The fellowship carries with it a stipend of up to \$28,000 plus travel allowances.

How to apply: Candidates should submit a letter of intent, a curriculum vitae, and three letters of recommendation. The letter of intent should include a statement of why the fellowship is desired, how you qualify for it, what issues and congressional situations interest you, what role you envision as a congressional science fellow, and what outcome you hope for in relation to career goals. The individuals from whom you request letters of recommendation should discuss not only your professional competence, but also other aspects of your background that make you particularly qualified to serve as a Congressional Science Fellow.

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Lehigh University is an equal opportunity affirmative action employer. Women and minorities are especially encouraged to apply.

Sedimentologist/Northern Illinois University. Department of Geology. The Department of Geology seeks to fill a tenure track position in Geophysics at the rank of Assistant Professor beginning August 15, 1985. Candidates with postdoctoral experience in applied sedimentology and whose research will involve students in field programs are most desired. The successful candidate will be expected to participate in and conduct an aggressive research program, teach at both the graduate and undergraduate levels, and interact with faculty and students in geophysics, geology, geochemistry and hydrology. The Department, which offers both the M.S. and Ph.D. degrees, is composed of 15 faculty active in a wide range of research programs. Fertile equipment owned by the Department includes a microcomputer, several magnetometers and gravimeters, a sedimentometer with a variable seismic system. Applicants should send a letter of application, resume, statement of research interest, and the names of three references to: Chair, Geophysics Search Committee, Department of Geology, Northern Illinois University, DeKalb, IL 60115.

Application deadline is January 15, 1985. Northern Illinois University is an equal opportunity/affirmative action employer.

Saint Louis University. The Department of Earth and Atmospheric Sciences invites applications for a tenure-track assistant professor position in geophysics effective for the fall of 1985. We seek an individual with broad interests who will complement active research programs in sedimentology and earth structure. Preference will be given to candidates who can teach existing courses in sedimentology, geophysics and/or geodesy. The successful candidate must have a Ph.D. degree and will be expected to maintain an active research program, to teach geophysics courses at the graduate and undergraduate levels, and to supervise graduate student research. The application deadline is January 15, 1985. Applicants should send a curriculum vitae, a statement of research and teaching interest and the names of 4 professional references to:

Dr. Brian J. Mitchell, Chairman
Department of Earth and Atmospheric Sciences
Saint Louis University
PO Box 8009—Lafayette Station
St. Louis, MO 63195

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College of Geosciences/University of Oklahoma. Applications and nominations are invited for the position of Director of the School of Geology and Geophysics. The Director is expected to have a Ph.D. or equivalent, a strong ongoing research program and administrative experience. The position is expected to be filled by July 1, 1985; salary to be negotiated. In 1986, the School will move into the new 300,000 sq. ft. Energy Center along with other elements of the College of Geosciences; the Oklahoma Geology Survey; and the School of Petroleum and Geological Engineering and the School of Chemical Engineering and Materials Sciences, both from the College of Engineering.

Applications with curriculum vitae, names and addresses of three references, and/or nominations should be sent to:

Francis G. Stehli, Dean
College of Geosciences
University of Oklahoma
600 East Street, Room 438C
Norman, OK 73019

Consideration of applications will begin January 1, 1985.

The University of Oklahoma is an Equal Opportunity/Affirmative Action Employer.

Research Groundwater Hydrologist

Argonne National Laboratory's Geoscience and Engineering Group seeks a groundwater hydrologist to conduct innovative research and to assist in the assessment of groundwater problems related to energy technologies.

Considerable knowledge of groundwater transport processes and experience in the use and development of related numerical models are required. Experience in research on the relationships between field data and model results is desirable. Strong written and verbal skills are necessary. The levels of knowledge and skills required will typically have been acquired through advanced formal education and several years of relevant experience and have been documented in publications.

On-going studies related to the siting of high-level radioactive waste repositories provide a variety of challenging groundwater problems. Argonne offers excellent computing and support facilities which will provide the opportunity to initiate activities in basic or applied groundwater research motivated by other energy/environment concerns.

Responses should be directed to:
Rosalee L. Bottino,
Box EKS-22537-80,
Argonne National Laboratory,
9700 South Cass Avenue,
Argonne, IL 60439

An Equal Opportunity/
Affirmative Action Employer.

Hydrologist. Monterey, California. \$1,887 to \$2,295 per month plus benefits. Requires BS in Hydrology, computer programming skills and three years' experience. Apply by 5:00 p.m. November 15, 1984. Send resume to Monterey Peninsula Water Management District, P.O. Box 85, Monterey, California 93940. Call 408-448-4860 for job flyer. EOE.

Texas Tech University/Geophysicist or Classic Sedimentologist. The Department of Geosciences at Texas Tech University seeks applications for a tenure track position in the field of geophysics or classic sedimentology to begin August 1985. Rank and salary will be commensurate with qualifications. The Ph.D. is required. Entry-level applicants will be given preference. The primary responsibility will be to teach both graduate and undergraduate courses in geophysics or depositional systems and sedimentology, higher specialty, and introductory geology. The person will be expected to initiate a research program and to direct MS and Ph.D. graduate students. Send a letter of application with complete curriculum vitae and names of three references to: Dr. Alonso D. Jaca, Chairman of Geosciences, P.O. Box 4109, TTU, Lubbock, TX 79409.

Texas Tech is an equal opportunity/affirmative action employer. Application deadline: January 31, 1985.

Sedimentologist/University of Utah. The Department of Geology and Geophysics at the University of Utah seeks applicants for a tenure track faculty position in sedimentology at the assistant to associate professor level. Applicants with backgrounds and specialties in seismic imaging, seismic reflection or theoretical sedimentology will be given preference. The individual will be expected to teach undergraduate and graduate courses and to pursue an active research program with graduate students. A seismic imaging laboratory with a VAX 11/750, FPS array processor, physics, and processing and analysis software is available to the successful candidate. Current research in sedimentology includes: earthquake research utilizing a PDP 11-70 computer; monitoring of the International seismic belt by an 8 station telemetered network utilizing an on-line PDP 11-54 computer; major experiments in seismic refraction and reflection profiling for crustal structure; and allied research in tectonophysics. The opportunity exists to participate with several other faculty in an integrated program of tectonics, sedimentology and petroleum exploration. The geophysics component of the department has active research and teaching programs in electrical and electromagnetic methods, thermal properties of the earth, potential fields, and sedimentology. The department has close association with the numerical analysis and data processing groups in computer science, electrical engineering and mathematics. The closing date for applications is December 31, 1984, and the appointment date is September 15, 1985. A Ph.D. is required for this position. Applicants should submit a vita, transcripts, a letter describing his/her research and teaching goals and names of five persons for reference. Qualified persons should send their applications to William F. Nash, Chairman, Department of Geology and Geophysics, University of Utah, Salt Lake City, Utah 84112-1183.

The University of Utah is an equal opportunity/affirmative action employer.

Faculty Positions in Geochemistry and in Neotectonics. The State University of New York at Binghamton invites applications for tenure track positions in these two areas beginning August, 1985. The appointments will be at the Assistant or Junior Associate professor level and will require completion of the Ph.D. prior to this date. The candidates must demonstrate potential to develop a productive research program as well as teach at the undergraduate and graduate levels.

The geochemist should have primary interest in some aspect of low temperature geochemistry. The neotectonist should have some interest and experience in study of sedimentology and/or geomorphic processes and products as well as tectonic ones. Applicants should send a resume and names of three persons who can be contacted for references to: J.R. Berrower, Department of Geological Sciences and Environmental Studies, State University of New York, Binghamton, NY 13901.

The State University of New York is an affirmative action/equal opportunity employer. The closing date for this position is 15 December 1984.

Visiting Appointments/Princeton University. A limited number of one-year visiting appointments, with the possibility of renewal, are available on a competitive basis for those candidates who wish to carry out research in dynamics and predictability of the atmosphere and oceans, climatology, atmospheric and oceanic chemistry, basic geophysical fluid dynamics, and solid earth geophysics. Successful applicants will have access to the facilities of the Princeton University Fluid Dynamics Laboratory/NOAA. Information and application forms can be obtained from: Geophysical Fluid Dynamics Program, Princeton University, P.O. Box 308, Princeton, New Jersey 08542.

Princeton University is an equal opportunity employer—M/F.

Postdoctoral Position/Oregon State University. Research Associate (postdoctoral), at Oregon State University's Cooperative Institute for Marine Resources Studies. Expertise in physiological and chemical ecology with interest in interactions of hydrothermal vent fauna with the unique biogeochemical properties of their environment. Familiarity with state-of-the-art analytical techniques (GC, LC, MS, HPLC) highly desirable. One (1) year, renewable for a second year subject to approval. Send C.V., names and addresses of three (3) references by 30 November 1984 to Director, CI-MRS, Hatfield Marine Science Center, Newport, Oregon 97365.

OREGON STATE UNIVERSITY, AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER, COMPLETES VITTI SECTION 508 OF THE REHABILITATION ACT OF 1973.

Harvard University/Faculty Position in Petrology. The Department of Geological Sciences, Harvard University, invites applications for a faculty position in petrology. We are interested in persons concerned with the mineralogy and the major and/or trace element chemistry of metamorphic and igneous rocks in relation to their geologic and tectonic setting. Experience with modern methods for the study of natural rocks, both in laboratory and in the field, is essential. The successful applicant must have the Ph.D. degree by the time of appointment and demonstrated capabilities to conduct original research and to teach both undergraduate and graduate students. The appointment will be made as Assistant or Associate Professor level beginning September 1, 1985. Candidates must have an internal range of \$25,000-\$32,000 for Assistant Professor and \$30,000-\$35,000 for Associate Professor. Appointments are made for an initial term of up to five years. Interested applicants should send a vita, bibliography, and names of three references to: Professor Adam M. Drzewinski, Harvard University, 20 Oxford Street, Cambridge, MA 02138.

Harvard University is an equal opportunity/affirmative action employer. Women and minorities are encouraged to apply.

DEAN COLLEGE OF ENGINEERING Colorado State University

Nominations and applications are invited for the position of Dean of the College of Engineering. Colorado State University is a comprehensive research university of 18,000 students, located 60 miles north of Denver. The College of Engineering has 1,400 undergraduate and 400 graduate students in the departments of Agricultural and Chemical, Civil, Electrical, and Mechanical Engineering, Atmospheric Science and the Engineering Science major. Each department offers MS and PhD programs. The College has 110 faculty who annually conduct about \$15M of contract and grant research in support of the graduate programs in the five departments. A new computer-assisted engineering center serves the entire College. Applicants must have a doctorate, be tenurable in one of the departments, have a distinguished record of publications in scholarly journals, experience in contract/grant activities, and have substantial teaching and administrative experience. The Dean is expected to provide leadership for the undergraduate and graduate teaching programs as well as the research activities. Salary will be commensurate with comparable positions at other land grant institutions. Applicants should send a letter of intent, a resume and also ensure that five letters of reference are sent to Dr. Robert D. Phemister, Dean's Search Committee, Office of the Dean, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, CO 80523. Applications must be received by January 15, 1985.

Colorado State University is a BEO/AA employer. Equal Opportunity office: 314 Student Services Building, Colorado State University, Fort Collins, CO 80523.

South Dakota School of Mines and Technology. The Department of Geology and Geological Engineering is seeking applicants for a full-time tenure track position in geological engineering beginning fall 1985. Applicants should have a Ph.D. degree or commensurate experience including "Registration" in petroleum engineering or names of three hydrogeologists and will be expected to teach at both undergraduate and graduate levels as well as conduct an active research program in their field of specialization.

The Department has an undergraduate enrollment of 200 majors and a graduate enrollment of 60. Field applications are emphasized. Interested persons should send a resume and three letters of recommendation to: Alvin Lieberman, Department of Geological Engineering, South Dakota School of Mines and Technology, Rapid City, SD 57701.

Deadline for applications is February 1, 1985. SDSMT is an equal opportunity employer.

Graduate Fellowships/University of Oklahoma. Fellowships for Ph.D. study in each of the following broad disciplines: (1) origin, ascent, and fractionation trends in magmas and associated ore deposits; (2) magmatic and tectonic evolution of continental lithosphere, including geophysical properties and structures of the upper crust; and (3) sedimentary processes, including organic and inorganic diagenesis, evolution of hydrocarbons, and correlation using biostratigraphic methods. Average annual stipend is \$10,000/month and the fellowship awards include a waiver of out-of-state tuition and fees. The School of Geology and Geophysics presently consists of 19 full-time faculty. Research facilities in the school include a stable isotope laboratory; organic geochemistry laboratory; computer automated microprobe and neutron activation analysis equipment; scanning electron microscope with energy dispersive analyzer; transmission electron microscope; fluid-inclusion laboratory; fluid inclusion microthermometry laboratory; 1d hydrothermal laboratory for phase equilibrium experiments; paleomagnetic laboratory with a cryogenic magnetometer and 48- and 192-channel digital remanence recording system; VAX 11-780 computer with high-resolution graphics and image processing software; and a 84,000-volume geology and geophysics library located in the department.

For further information on faculty and active research projects, contact: Kevin Crowley, School of Geology and Geophysics, University of Oklahoma, 830 Van Vleet Oval, Norman, OK 73019.

Sedimentary Petrology/Wright State University. The Department of Geological Sciences invites applications for a tenure track position in sedimentary petrology, at the assistant professor level beginning September 1, 1985. Candidates must have an internal range of \$25,000-\$32,000 for Assistant Professor and \$30,000-\$35,000 for Associate Professor. Appointments are made for an initial term of up to five years. Interested applicants should send a vita, bibliography, and names of three references to: Professor Adam M. Drzewinski, Harvard University, 20 Oxford Street, Cambridge, MA 02138.

Harvard University is an equal opportunity/affirmative action employer. Women and minorities are encouraged to apply.

Wright State University is an equal opportunity/affirmative action employer.

A WORKSHOP ON ODP DRILLING IN THE N.E. PACIFIC

INPAC (International N.E. Pacific Activities Consortium) announces a workshop to further define a drilling program in the N.E. Pacific using the new ODP drilling ship SEDCOIMP 471, which is scheduled to be in the region in summer 1990. The workshop will take place at the School of Oceanography, University of Washington on February 20-22, 1985. The three-fold focus of the proposed integrated, multi-disciplinary drilling program will include: (1) ridge crest processes on the Juan de Fuca Ridge, (2) convergent margin processes off the Washington, Oregon, and British Columbia coasts, and (3) paleo-oceanography of the N.E. Pacific. The purpose of the workshop will be to further define major scientific problems that can be addressed by drilling, to identify possible drill sites, to present the results of relevant on-going scientific programs in the area, and to organize the data gathering and synthesis necessary to write a comprehensive drilling proposal to JOIDES. The two and one half day workshop is open to all parties who have an interest in the drilling program in the N.E. Pacific. Interested parties should write to the INPAC Committee, c/o Paul Johnson, School of Oceanography WB-10, University of Washington, Seattle, WA 98195, prior to 1 December 1984.

Sedimentologist. The Department of Geological Sciences at the University of Texas at El Paso anticipates a tenure track position for a sedimentologist beginning September 1, 1985. Applications should have a strong commitment to research and teaching, which complement our ongoing efforts in lithospheric sedimentology. Our geophysics faculty is generally well equipped in terms of field, laboratory, and computational facilities. There are three geophysics positions in the Department of Geological Sciences and one in the Physics Department. The graduate student enrollment in the program is 15-20. A doctorate is required, and the appointment will be at the Assistant Professor level. The salary level will be competitive. Send resume and three letters of reference to: Dr. G.R. Keller, Chairman, Department of Geological Sciences, University of Texas at El Paso, El Paso, Texas 79968-0586. Closing date for applications is January 31, 1985.

The University is an equal opportunity/affirmative action employer.

Physical Oceanographer. The Physical Oceanography Branch of the U.S. Naval Oceanographic Office seeks full-time Oceanographers for the study of the effects of oceanic current and thermohaline structure on undersea systems using data collected from various platforms for a variety of projects. The projects involve the collection, analysis and reporting of physical oceanographic data directly applicable to relevant Navy environmental requirements. Up to 50% field duty may be required. Multiple vacancies at the GS-7, 9 and 11 levels are available depending upon qualifications and experience and will remain open until filled. Salary range: \$17,221 to \$35,139.

Please contact (for required forms): Debra Staples, #N00-72364, Commercial 601-688-5720, ext. 408-5720, or FTS 491-5720, U.S. Naval Oceanographic Office, Management & Personnel Division, Personnel Operations Branch, Code 4380, Bay St. Louis, NSTL, Mississippi 39522.

University of Utah: Structural Geology/Tectonics/Tectonophysics. The Department of Geology and Geophysics at the University of Utah seeks applications for a tenure track position in structural geology, tectonics or tectonophysics. It is anticipated that this position will be filled at the assistant professor level, but applications by more senior persons will be considered. The position requires a Ph.D. with emphasis in structural geology, regional tectonics or tectonophysics. The new faculty member will have the opportunity to teach in the area of his or her specialty and may have an opportunity to establish a vigorous research program involving graduate students. The person who fills this position will join an active program in structural geology and tectonics that includes both field projects and integrated geology/geophysics as mechanics/fluid chemistry studies of structures in the western Cordillera. There is an excellent opportunity to collaborate with other faculty in structural geology, sedimentology, geophysics, geochemistry and petrology. A vita, copies of publications, names of three persons that may provide references, and a letter outlining the candidate's research and teaching interests should be sent to: Dr. William F. Nash, Chairman, Department of Geology and Geophysics, University of Utah, Salt Lake City, Utah 84112-1183. Deadline for receipt of applications is November 31, 1984 with the appointment starting in September 1985.

The University of Utah is an equal opportunity/affirmative action employer.

Postdoctoral Fellowships at the Woods Hole Oceanographic Institution. OCEAN SCIENCE AND ENGINEERING Applications are invited from new or recent graduates in science or engineering with interests in physical oceanography, marine chemistry, marine geology and geophysics, biological oceanography, or oceanographic engineering. Recipients of awards are selected on a competitive basis, with primary emphasis placed on research promise.

Fellowships are awarded for one year with a stipend of \$23,100 plus group health insurance and a modest travel budget. Recipients are encouraged to carry out their own research interests independently or in association with resident staff. Completed applications must be received by 15 January 1985 for 1985-86 awards. Awards will be announced by 1 March. Write for application forms.

Dean of Graduate Studies
P.O. Box 8
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02542
Equal Opportunity/Affirmative Action Institution

Sedimentologist/Ohio State University. The Department of Geology and Mineralogy, The Ohio State University, invites applications for a tenure track position for a sedimentologist with research interests in tectonic geology and tectonics. The successful applicant must be prepared to assist in teaching exploration geophysics courses, advanced topics in sedimentology, conduct research, and supervise graduate students. Postdoctoral or industrial experience is desirable. Rank and salary commensurate with experience and research record. Please send applications or nominations to:

Dr. Ralph R.J. van Wee
Chairman, Search Committee
Department of Geology and Mineralogy
The Ohio State University
Columbus, OH 43210
Telephone: 614-422-5635 or 422-7221.

Applications should include a resume, a statement of research interests and three persons who can be contacted for references. The closing date for applications is December 1, 1984; appointments will be effective no later than October 1, 1985. Additional information can be obtained by writing or calling the chairman of the search committee.

The Ohio State University is an equal opportunity/affirmative action employer.

Cosmochemistry Faculty Position/University of Arizona. The Department of Planetary Sciences and the Lunar and Planetary Laboratory invite applications in a continued search to fill a state-funded, tenure track position in cosmochemistry. The area of specialization within Cosmochemistry is open. The appointment involves research, teaching, and the supervision of graduate students. The successful candidate will be either at a junior level with extraordinary promise of scientific accomplishment, as well as the potential for developing substantial leadership capabilities and an international scientific reputation, or will be at a senior level having already demonstrated these qualities. Applications, including a resume and the names and addresses of four individuals who could serve as professional references, should be sent, by December 31, 1984, to: Professor Eugene H. Levy, Head, Department of Planetary Sciences, University of Arizona, Tucson, AZ 85721.

The University is an equal opportunity/affirmative action employer.

AGU STUDENT MEMBERS

Special 50% discount
on "paid & carried"
books at the AGU
Fall Meeting. Ask
at booth for details.

Professor (Research)/Stanford University/Plasma Physics, EM Waves, Space Physics. We are seeking a senior person who has demonstrated scientific, managerial, and leadership qualifications in one or more of the following disciplines: Space Plasma Physics, electromagnetic waves, and solar-terrestrial physics. We expect the successful candidate to have published an outstanding reputation, documented by professional writings or other evidence of personal technical creativity, letters of reference from recognized research leaders in the disciplines mentioned above, and/or awards and other recognition from appropriate professional societies.

It is expected that the individual will develop a research program in one of the disciplines mentioned above working in coordination with ongoing programs within the STAR Laboratory and, possibly, with other activities within the Stanford Center for Space Science and Astrophysics. It is expected that this individual will have a strong background in experimental techniques, either in the laboratory or in the field, including the environment of space; extensive experience in the design and construction of plasma physics and/or electromagnetic theory will clearly be desired. It is also expected that the individual will have a demonstrated capability for recruiting federal or other research grant support, or be deemed by the selection committee of the capable of securing such support.

It is anticipated that the person chosen will devote the major part of his or her time to research activities. However, there is an opportunity for participation in other activities of the Electrical Engineering Department, including teaching graduate and undergraduate classes, serving on various committees of the department, and the university. It is expected that the person chosen will participate actively in the training of graduate students.

The Chairman of the selection committee for this position is Professor Robert A. Hellwul, Professor of Electrical Engineering, Stanford University, Stanford, California 94305. Other members of the selection committee include Professor P.M. Banks, Professor R.N. Bessert, Professor L.R.O. Steele, and Professor L. Tyler.

Application deadline is November 15, 1984.

High Altitude Observatory Scientific Visitor Program/NCAR. Scientific visitor appointments at the High Altitude Observatory are available for new and established Ph.D.s for up to one year to carry out research in solar physics, solar-terrestrial physics, and related subjects. Applicants should provide a curriculum vitae, including education, work experience, publications, the names of three scientists familiar with their work, and a statement of their research plans. Applications must be received by 15 January 1985 and they should be sent to: The HAO Visitor Committee, High Altitude Observatory, National Center Atmospheric Research, P.O. Box 3000, Boulder, Colorado 80507-3000.

NCAR is an Equal Opportunity/Affirmative Action Employer.

Yale University/Solid Earth Geophysics. The Department of Geology and Geophysics is soliciting applications for a junior faculty position in solid earth geophysics to begin in the academic year 1985-1986. Areas of interest to the department include sedimentology, exploration geophysics, mechanical and physical properties of rocks and minerals, volcanism, tectonophysics, and geodesy. Curriculum vitae, publications and the names of three or more referees should be sent by December 1, 1984 to: Karl H. Turcotte, Chairman, Department of Geology and Geophysics, Yale University, Box 6666, New Haven, CT 06511.

Yale University is an equal opportunity/affirmative action employer and encourages applications from all qualified scientists.

Sedimentologist-Oceanographer/Texas A&M University. Applications are invited for a tenure track faculty position in the general field of marine sedimentology. The position will involve graduate level teaching and supervision of graduate students. The successful candidate will have demonstrated excellence in a field of marine sedimentology research in the field of marine sedimentology. The position is available beginning September 1, 1985. Salary and rank will be commensurate with experience and qualifications. Applicants are invited to submit curriculum vitae, copies of publications, names of three persons who may serve as references, and a letter outlining the applicant's research interests and research record by December 31, 1984, to: Robert O. Reid, Distinguished Professor and Head, Department of Oceanography, Texas A&M University, College Station, Texas 77843.

Texas A&M University is an affirmative action/equal opportunity employer.

University of Arizona/Groundwater Hydrologist. The University of Arizona, College of Engineering, Department of Hydrology and Water Resources, invites applications for a tenure track faculty position at the Assistant or Associate Professor level in groundwater hydrology. Applicants should have a strong background in hydrogeology, groundwater hydraulics, contaminant transport, and groundwater modeling. The position will involve teaching graduate and undergraduate classes and more of the above areas. Interested persons should send an up-to-date resume and the names of at least three references to:

Dr. Shlomo P. Neuman
Department of Hydrology and Water Resources
University of Arizona
Tucson, Arizona 85721

The University of Arizona is an affirmative action/equal opportunity employer.

Faculty Position in Applied Geophysics or Structural Geology. The Department of Earth Sciences, University of New Orleans, invites applications for a permanent faculty position commencing January 1, 1985 in APPLIED GEOPHYSICS or STRUCTURAL GEOLOGY.

The University of New Orleans, located on the south shore of Lake Pontchartrain, has 14,000 undergraduate and 2,300 graduate students. The Earth Sciences Department currently has a staff of 11 full-time and four part-time faculty and approximately 150 undergraduate geology majors and 60 master's students.

The applicant will be expected to teach graduate and undergraduate courses in geophysics-structural geology and general geology, conduct a program of research and supervise thesis. Applications are sent to the department chair with a curriculum vitae, a statement of research interests with individual experience. The Ph.D. degree is required.

Applicants should send a letter outlining interest in position, complete resume, and three letters of recommendation to:

Dr. Louis A. Fernandez, Chairman
Department of Earth Sciences
University of New Orleans
New Orleans, LA 70148

UNO, a member of the Louisiana State University System, is an equal opportunity/affirmative action employer.

SUPERVISORY OCEANOGRAPHER DIVISION LEADER

NOAA's Pacific Marine Environmental Laboratory is seeking qualified candidates for the position of Division Leader, Marine Resources Research Division. The Division is located at the Hatfield Marine Science Center, Newport, Oregon and is engaged in multidisciplinary research into deep sea hydrothermal venting, oceanic crustal tectonic processes, seafloor heat flux, and particle transport in the benthic boundary layer. The Division Leader has responsibility for program planning and budgeting, technical supervision of MRRD staff and liaison with other NOAA components. The Division Leader has primary obligation for leading the MRRD research program, but there is adequate opportunity to conduct individual research.

Candidates should have at least a PhD in physical oceanography and/or geology or related physical sciences. Candidates must have at least three years of professional research experience of which at least one year must have been comparable to the GS-14 level in the Federal service. Candidates must have experience in sea floor processes research including biological, chemical, geological or physical oceanography or they will not be found qualified for this position. Also, candidates must demonstrate that they have: the ability to conduct sea floor processes research; ability to conduct independent research; ability to develop, implement and monitor scientific research programs; ability to supervise a scientific/technical staff; ability to ensure fiscal accountability through management of program funds within budget constraints; ability to make technical presentations, both orally and in writing; and, ability to implement an effective Affirmative Action (EEO) program. Applicants are asked to describe their experience in each of the above seven factors. These responses should be considered as attachments to the basic application form. The salary ranges from \$50,495 to \$65,642 per year. This position is in the Federal Competitive Service; however, persons with no previous Federal service may apply. Applicants should refer to announcement number PMELWASC 84-292 (PM) when submitting applications (SF-171, "Personal Qualifications Statement", available at most Federal agencies) to:

NOAA, WASC, Personnel Division
7600 Sand Point Way NE
Seattle, WA 98115

by November 30, 1984. For further application information call Pete Macias at 206-526-6048. For further details on duties contact Dr. E. N. Bernard, Director, PMEL at 206-526-6800.

Professor/Chairperson: The University of Utah. The University of Utah Department of Civil Engineering is seeking applicants for the position of an assistant professor level in applied geophysics and/or hydrogeology commencing in August 1985. The applicant should be committed to developing a strong research program as well as teaching undergraduate courses in some aspects of engineering and environmental geology. The Ph.D. is required. Applicants with course work in engineering and an interest in the field application of geologic principles are especially encouraged to apply. Send letter of application outlining your professional goals, transcripts, resume, copies of publications, and three letters of reference to: Dr. Mary P. Anderson, Department of Geology and Geophysics, Weeks Hall, University of Wisconsin, Madison, WI 53706. Closing date is January 1, 1985.

The University of Wisconsin is an equal opportunity/affirmative action employer.

Chairman, Search Committee
Department of Chemical Engineering
University of Utah
Salt Lake City, UT 84112
alt 381-6916

The University of Utah is an affirmative action/equal opportunity employer.

Geochronology. The University of California, Davis, is seeking a tenure track, faculty position at the Assistant Professor level beginning Fall, 1985. Candidates having interests in isotope geochronology and/or the geochronology of economic resources are especially encouraged to apply but other specialties in geochronology will be considered. A Ph.D. degree is required. Responsibilities include teaching at the undergraduate and graduate levels, and research in geochronology. Applicants should submit complete vita, a statement of research and teaching interests and the names of three referees. Deadline for application is January 15, 1985. Inquiries and applications should be directed to: Dr. Howard W. Day, Department of Geology, University of California, Davis, CA 95616.

The University of California is an equal opportunity/affirmative action employer.

Faculty Position in Geophysics Frankfurt University (FRG)

The Institute of Meteorology and Geophysics at the Johann Wolfgang Goethe-University in Frankfurt (Federal Republic of Germany) has a vacancy at the C3-Professor level. The position is tenured. The appointee will be expected to teach courses in applied geophysics at the undergraduate and graduate levels (in German). Research experience in the area of geoelectric methods would be desirable but not condition. Candidates with other areas of research interest will also be considered.

Application with curriculum vitae, certificates on academic degrees, list of publications and teaching experience should be submitted to the President, Universität Frankfurt, Senckenberganlage 31, 6000 Frankfurt a. M. by November 15, 1984.

Meetings

Announcements

Chapman Conference on Ion Acceleration

Call for Papers

June 3-7, 1985 Chapman Conference on Ion Acceleration in the Magnetosphere and Ionosphere, Wellesley, Mass. Sponsors: AGU, (Ion Acceleration Meeting, American Geophysical Union, 2000 Florida Avenue, N.W., Washington, D.C. 20009; tel.: 202-462-6003 or toll free 800-424-2488).

The deadline for submission of abstracts is February 4, 1985.

Recent satellite and rocket data on particle distributions indicate that ions in the ionosphere and magnetosphere are subjected to a variety of energization processes. Wave-particle interactions, electrostatic double layers and shocks, Alfvén waves, anomalous resistivity, and $E \times B$ drift, magnetic inhomogeneities, and other ideas have been proposed as viable mechanisms responsible for the energization of ions. For the most part, however, coherent theories capable of providing definitive descriptions of the observed ion acceleration phenomena have not yet emerged.

The purpose of this conference is to bring together experimentalists and theoreticians engaged in the study of various aspects of ion energization processes in the magnetosphere, to promote interchange of ideas among these active researchers, and to attempt to achieve some basic understanding of these interesting and complex space plasma phenomena.

Format and Abstracts. Aside from several invited review talks, this conference will consist mainly of contributed oral and poster papers. Topics to be covered by the conference include ion acceleration processes at high latitudes (auroral arc, polar cap, polar cusp), ion acceleration processes in the plasma sheet and its boundary layer, ion acceleration processes in the equatorial region (geosynchronous orbit, ring current, etc.), ion acceleration processes in active ionospheric and magnetospheric experiments (charged beams, gas releases, etc.), ion acceleration in laboratory plasmas (space simulation and scaled experiments), microscopic ion acceleration processes (wave-particle interactions, double lay-

ers, stochastic heating, etc.), and macroscopic acceleration processes (adiabatic processes, shocks, etc.).

All interested in attending and in receiving later information circulars should write to the address given above. For more information on the scientific program, contact Tom Chaug, Center for Space Research, Room 37-261, Massachusetts Institute of Technology, Cambridge, MA 02139; telephone: 617-253-7525. Abstracts should follow the standard AGU format, as published in *Eos*, August 14, 1984. There will be no abstract charge. Authors are requested to indicate their preference for the mode of presentation (oral or poster), although papers may be assigned to either mode depending on the overall plan of the conference program.

Program Committee. R. Arnoldy, M. Ashour-Abdalla, R. Bostrom, C. G. Fälthammar, L. Frank, H. R. Balsiger, D. Corney, G. Haerendel, D. Hardy, J. P. Heppner, B. K. Hultquist, D. Klumpar, R. Lyman, F. Mozer, H. Okuda, R. Olsen, S. Ossakow, R. Schunk, E. C. Shelley, E. Westcott, D. Williams, D. Winchingham, and D. Young, and the co-convenors, Tom Chang, J. R. Jasperse, R. G. Johnson, P. M. Kintner, and M. Schulz.

Student Travel. Limited funding will be available to support student travel expenses to the conference. To apply, call the AGU Meetings Department at the number given above and ask to be sent a travel grant application. The award will be selected by AGU in conjunction with the co-convenors. Deadline for travel applications is January 7, 1985.

JECSS Workshop

May 13-18, 1985 Third JECSS (Japan and East China Seas Study) Workshop, Tsukuba Univ., Japan. Sponsors: Japan Marine Science and Technology Center, Oceanographic Society of Japan, Japanese-French Oceanographic Society, AGU, (Takashi Ichio, Dept. of Oceanography, Texas A & M Univ., College Station, TX 77843).

The deadline for the submission of one-page abstracts is November 30, 1984.

The purposes of this workshop are to exchange research results in hydrography, circulation, physical and chemical properties, and sedimentology of the East Asian marginal seas and to plan cooperative programs for field experiments and modeling. Papers in

the topics listed are invited and will be arranged into discussion groups and presentations around the lectures of the invited speakers.

Coral Reefs

May 27-June 1, 1985 Fifth International Coral Reef Congress, Tahiti, French Polynesia. (Organizing Committee, Coral Reef Congress, B.P. 562 Papeete, Tahiti, French Polynesia).

The submission deadline for the 300-word abstracts is December 1, 1984. Abstracts should be submitted in both French and English.

The congress will consist of two principal parts. The first is a symposium entitled "Late Quaternary and Present Sea-Level Changes: Magnitude, Causes, Future Applications." Papers for this symposium are being solicited on topics including global, regional, and local histories of sea level changes, measurement, modeling, and interpretation of such changes, correlation of changes with tectonic, climatic, and oceanographic changes, and prediction of near-future changes for application to a variety of problems, especially those relating to coral reefs. The second part is a seminar entitled "Reef Growth and Sea-Level Change: The Environmental Significance." This seminar, chaired by P. J. Davies, will deal with the identification of the sea level signature in reefs from varied environments, including the analysis of variations of fauna, diagenesis, isotopes, calcification, and sedimentology.

Hydraulics and Hydrology

Aug. 13-16, 1985 Hydraulics and Hydrology in the Small Computer Age, Orlando, Fla. Sponsors: Hydraulics Division, American Society of Civil Engineers. (William R. Waldrop, TVA Water Systems Development Branch, PO Drawer E, Norris, TN 37828; tel.: 615-632-4460).

The submission deadline for one-page abstracts is December 1, 1984.

Papers are solicited for presentation in technical sessions on topics including computerized data acquisition systems in the labora-

tory and in the field, microcomputer software applications in hydraulics and hydrology, coastal and wetlands processes, groundwater hydrology, surface water hydraulics and hydrology, and hydropower development. Various special tours and exhibits are also planned.

Future AGU Meetings

Fall Meetings

Dec. 3-7, 1984, San Francisco, California.

Dec. 9-13, 1985, San Francisco, California. Abstracts due mid-September 1985.

Dec. 8-12, 1986, San Francisco, California.

Spring Meetings

May 27-31, 1985, Baltimore, Maryland. Abstracts due early March 1985.

May 19-23, 1986, Baltimore, Maryland.

Regional Meetings

Front Range Branch Hydrology Days, April 16-18, 1985, Fort Collins, Colorado. Abstracts due December 31, 1984 for professional hydrologists, February 15, 1985 for students; call for papers appeared in July 24, 1984 *Eos*.

Chapman Conferences

Solar Wind-Magnetosphere Coupling, February 12-15, 1985, Pasadena, California. Abstracts due November 1, 1984; call for papers appeared in July 10, 1984 *Eos*.

Ion Acceleration in the Ionosphere and Magnetosphere, June 3-7, 1985, Boston, Massachusetts. Abstracts due February 4, 1985; call for papers appears in this issue.

Magnetotail Physics, October 28-31, 1985, Laurel, Maryland.

The last Geophysical Year calendar ran October 23, 1984, in *Eos*.

mixed layer - ocean circulation model. Of particular interest is a case that simulation of the mixed layer by a two-dimensional model, measurements of the Holmboe front were taken in calm weather and then the wind increased to 10-15 m/s. The wind front, for this forcing, the model results are consistent with the observations predicting the deepening of the frontal interface, resulting of the surface isopycnals and very little horizontal displacement of the surface front. However, the model results show a mixed-layer deepening and failed to predict the observed entrainment of the isopycnal front. Three-dimensional models are considered to assess the effects of a change in the wind direction and the inclusion of a surface buoyancy flux. The inclusion of a diurnal surface buoyancy flux produces very different responses from the simulations with no buoyancy flux. When the surface buoyancy flux is negative, the mixed layer reforms at deeper frontal positions. When the surface buoyancy flux is positive, the mixed layer reforms at shallower frontal positions. The inclusion of a mixed-layer process from the surface atmospheric forcing, in a numerical model, is a promising procedure.

J. Geophys. Res., C, Paper 42127.

Particles and Fields—Interplanetary Space

5180 Solar wind plasma

THE POSITION OF A STANDING SHOCK IN A POLYTROPIC SOLAR WIND

Shadia R. Babel (Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge, MA 02138).

We show how a one-dimensional wind model exhibits properties similar to an isothermal wind model. In particular, we show that, when the wind speed is much greater than the sound speed, the flow is supersonic and the shock is a standing shock. In the case of a polytropic wind, the shock is a standing shock only if the polytropic index is less than 5/3. This result is important because it shows that a standing shock solution is more likely to exist in a continuous solution than in a shock solution. By following the temporal evolution of the shock, we show that a standing shock solution is more likely to exist in a continuous solution than in a shock solution. This result is particularly important because it shows that a standing shock solution is more likely to exist in a continuous solution than in a shock solution.

J. Geophys. Res., A, Paper 48140.

Particles and Fields—Ionosphere

5145 Ionospheric disturbances

A LABORATORY INVESTIGATION OF THE HIGH-FREQUENCY PARLEY-BUNNEN INSTABILITY

R. Bann (Dept. of Physics and Astronomy, University of Iowa, Iowa City, Iowa 52242; M. DiGirolamo, R. L. Millio).

A laboratory investigation of the high-frequency Parley-Bunnen instability in a four-wave system. The instability was studied theoretically by Lee et al. (1971) and is predicted to occur in the ion E region of the ionosphere when the ZF drift velocity of the electrons relative to the ions is several times C_s , the ion acoustic speed. In our experiments, an increase of the electric field well above the ion acoustic speed was used to produce the instability. The observed frequency spectrum of the instability is in good agreement with the theoretical prediction. The instability is found to be a nonlinear phenomenon and is characterized by a sharp increase in the growth rate as the electric field is increased. The instability is found to be a nonlinear phenomenon and is characterized by a sharp increase in the growth rate as the electric field is increased.

J. Geophys. Res., A, Paper 48065.

APPROXIMATE RESULTS FROM THE "HORN" PROJECT: IN SITU MEASUREMENTS OF THERMAL AND DYNAMIC PROPERTIES OF THE SOLAR WIND

R. Bann (Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge, MA 02138).

The solar wind is a complex medium. It is a plasma with a magnetic field and a temperature. It is a fluid with a viscosity and a conductivity. It is a gas with a pressure and a density. It is a solid with a shear modulus and a bulk modulus. It is a liquid with a surface tension and a viscosity. It is a plasma with a magnetic field and a temperature. It is a fluid with a viscosity and a conductivity. It is a gas with a pressure and a density. It is a solid with a shear modulus and a bulk modulus. It is a liquid with a surface tension and a viscosity. It is a plasma with a magnetic field and a temperature. It is a fluid with a viscosity and a conductivity. It is a gas with a pressure and a density. It is a solid with a shear modulus and a bulk modulus. It is a liquid with a surface tension and a viscosity. It is a plasma with a magnetic field and a temperature. It is a fluid with a viscosity and a conductivity. It is a gas with a pressure and a density. 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